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DERMATOLOGY

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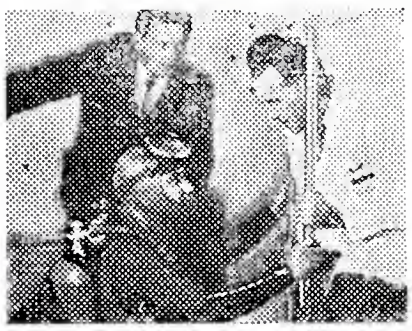

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Guest Editorial

DR. RICKY KANEE SCHACHTER received her B.A. from the University of Saskatchewan and her M.D. from the University of Toronto. She took her postgraduate training at the College of Physicians and Surgeons, Columbia University in New York. Dr. Schachter is a fellow of the Royal College of Physicians and Surgeons of Canada. She is currently Associate Professor in the Department of Medicine at the University of Toronto and Chief of the Dermatological Division at Women's College Hospital, Toronto.

Each era in medicine brings with it a change of emphasis. The present emphasis by government is on effective, efficient delivery of medical care. This has brought about many changes you are aware of. There is an increased interest in training of family physicians. If the family can be looked after as a unit, the benefits can be directed toward prevention of mental and physical illness. If this is the goal, where does dermatology fit into the picture?

It is estimated that 1 in 5 of every patient seen by the family physician will have a dermatological problem, either as a primary complaint, or as a complication of therapy. The primary complaint may be due to one of the common skin diseases, or to cutaneous manifestations of systemic diseases.

For decades, students and practising physicians were detracted from a study of the skin by many factors. We will discuss a few. The single most common obstruction was the lengthy morphological terminology, or the equally lengthy use of names, usually with bizarre and complicated spelling. Secondly, dermatologists, more readily than other specialists, said "Cause unknown." Thirdly, there was still the myth of "Cure." Dermatological patients do get better when properly diagnosed and treated. We deal with the general variety as all fields of medicine. Some malignancies or collagen vascular diseases still lead to death.

The need to learn the language of any system is acceptable and in fact necessary. We have dropped the long Latin forms. We still stress a morphological classification. This is in fact the gross pathology. Morphology is a tool to aid the student and physician to rapid classification of the condition they are dealing with.

The fact that the etiology is varied is no different than the multiple causes of chest pain. Etiological factors of the skin are the same as those of diseases of the lung, liver, kidney or heart. If you master the ability of "reading the skin" and put it in the proper perspective of looking at the patient as a whole, you are utilizing valuable clues to the genetic, immunologic, psychological, inflammatory, neoplastic or degenerative states of the patient, and/or the function of other systems.

Knowledge of the normal physiology and biochemistry of the skin is necessary for a better understanding of the pathophysiology of the disease you are dealing with. A good example of the correlation of the basic science and disease, is seen with pigmentation in health and in a pathological state. Even acne which will be one of the most common skin diseases you will see in young people, may be seen as a result of a drug or tumor of the pituitary initiating the same basic pathophysiology.

GUEST EDITORIAL

What about the "Black Magic" of therapy? Basic principles in therapeutics with special application will stand you in good stead. Simple application of these principles will save the patient money and time. The use of a suitable antibiotic for an infection diagnosed properly, clinically and by culture; the recognition of skin tumour, granuloma, or fungus infection will save millions of pounds of steroid cream now lavishly prescribed at high cost.

The concept of "cure" has undergone a radical change. Latent, or arrested infections have been known to be the pattern in Herpes Zoster and tuberculosis of the skin. An acute primary irritant contact dermatitis can be treated but will not alter the basic problem if it is an atopic patient or one with ichthyosis or xerosis in an occupation or environment that is prone to continue to be unsatisfactory as far as recurrences are concerned.

The physician has an excellent opportunity in the management of problems of the skin to stress prevention. The choice of occupation, and life style can make a considerable impact on the future well-being of the patient. A young man who has been troubled with severe acne would be well advised not to take up residence in the tropics. An atopic individual can try to choose a life pattern not subject to constant changes of temperature, or exposure to a multitude of allergens. Suffice it to say that basic information with regard to the prevention of venereal disease continues to be lacking. It is surprising how many people are unaware of the fact that the contraceptive pill may prevent conception but not syphilis.

It is dramatic to deal with a crisis or life-saving situation in medicine. However, drama does not constitute the bulk of medical care. Day to day medical care involves dealing with the conditions in our community that can be treated effectively in an ambulatory fashion. This will decrease the need of more expensive hospital care, and the general morbidity in society. Stasis dermatitis can be effectively treated before the development of indolent ulcers. Healing of the ulcer requires knowledge of anatomy of the venous system, the cardiac state, microbiology of the local lesion, the concomitant disease affecting healing and the expertise of treatment.

We wish to enable you to be able to serve your community and relieve the distress of your patients. Dermatological knowledge will bring personal satisfaction in dealing with a major part of your patient load. We also want you to continue to search for improvements in knowledge and application.

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CANADIAN ARMED FORCES ..... Inside Front Cover

ORTHO PHARMACEUTICAL ..... Inside Back Cover

(The heartache of) PSORIASIS

Lorne Direnfeld, B.Sc., 7T5

The prevalence and stigma of psoriasis have provided exceptional opportunity for drug companies and manufacturers of patent medicines to make money. ("We *understand* your *horrible* problem, so buy this fantastic new ointment and everything will be alright.")

Psoriasis is of special interest to me for two main reasons:

1) It is a common disease.

2) It is characterized by changes in normal growth pattern and morphology and may provide a model for other growth disorder (perhaps neoplastic).

Psoriasis – is a chronic and occasionally acute, relapsing papulosquamous skin disease. It consists of well defined reddish-brown papules or plaques surmounted with a characteristic silvery scale.

ETIOLOGY

Although a specific cause for psoriasis is unknown, heredity is seen to play a role in approximately one third of patients. Some studies have speculated that the mode of inheritance may be autosomal dominant with sixty percent penetrance. However, other patterns of inheritance probably exist. This condition is uncommon in Negroes but occurs in one to two percent of Caucasians and may occur in either sex at any age. It is frequently most severe between the ages of ten and fifty years.

Secondary factors influencing psoriasis include local trauma, preceding mild inflammatory disease and climate.

PATHOPHYSIOLOGY

Psoriasis is an accentuation and mis-direction of the keratinizing process in association with some changes in cutaneous vascular structure. It is primarily a disease of epidermal growth. The normal turnover of epidermis is twenty-eight days. In psoriasis this rate may be increased seven times. This high turnover of epidermal cells is accompanied by a thickening of the epidermis (acanthosis), especially of the prickle cell layer. In the psoriatic epidermis, there also seems to be an increase in lysosomes which may play a part in abnormal keratinization. The water binding capacity of the epidermis is lowered and dermal papillae are enlarged and elongated. In addition, the subpapillary capillary plexuses may become dilated, and there is an apparent proliferation of connective tissue in the dermis. The electron microscope shows diminution in tonofibrils, reduction and alterations in desmosome development and enlarged intracellular spaces.

There may by a poly-genic environmentally induced defect in the adenyl cyclase and cyclic-AMP cascade. An increase in the cyclic-AMP concentration leads to a decreased growth rate in normal epidermis. A defect resulting in a decreased concentration of cyclic-AMP may lead to an increased growth rate in the epidermis. This genetically mediated biochemical defect may be a cause of psoriasis.

NATURAL HISTORY

The gradual onset of psoriasis is usually asymptomatic and frequently ignored. The variable course of this disease seems to be characterized by hesitating progression with periods of inactivity and a marked tendency to regress during the summer months and often during pregnancy. The frequency and duration of remissions and recurrences vary from patient to patient and within the same patient. Except for arthritis and the psychological stigma, general health is not affected. Itching is seldom severe and lesions heal without scarring. The lesions are thick with silvery overlying scales and have sharply demarcated borders and a distinctive red colour. There is usually no vesiculation, oozing or crusting. Individual lesions vary in size from drop-like (guttate), to huge geographic plaques, to generalized erythroderma. When the scale is scraped off, several punctate bleeding points appear (Auspitz's sign). Psoriasis also exhibits the Koebner phenomenon (isomorphic response), i.e. the tendency of new lesions to appear at the site of trauma (incisions, burns, scrapes) in apparently normal skin. Anxiety, tension, worry and emotional upsets seem to be associated with an increase in pruritis and symptoms of discomfort from the lesions but rarely with the appearance of new lesions.

PATTERN OF DISTRIBUTION

Characteristically the disease involves the scalp, the extensor surfaces of the extremities (especially elbows and knees) the back and the buttocks. It may also affect the nails, eyebrows, axillas, umbilicus, and anogenital regions. Hair growth is not altered. The lesions are usually symmetrically distributed over the elbows, knees and scalp. Certain affected areas show distinctive features. Lesions of the external auditory canal reveal scaling and dryness often without erythema.

Palms and soles show vesicular and pustular pruritic lesions. The nails may look as if they are infected with a fungus. They appear thickened and discoloured (yellowish) with pitting and the free edge may be elevated and separated from the nail bed due to piling up of keratinous debris. Intertriginous areas have smooth, shiny, erythematous lesions which may be intermittently pruritic and may contain painful fissures.

Variations and complications of psoriasis include:

Acute guttate psoriasis – is a form in which drop-sized (guttate) lesions appear suddenly over a large portion of the skin surface. This is usually in association

with a beta-hemolytic streptococcal upper respiratory tract infection and follows the infection by one to three weeks.

Pustular psoriasis – is a chronic relapsing form with pustular lesions covered by thin scales. It may involve only the palms and soles.

Psoriatic erythroderma – is a severe generalized exfoliation of erythroderma that occurs in a small percentage of patients with psoriasis, and is a serious complication.

Psoriatic arthritis – occurs in a small number of patients (two to ten percent of patients). It is usually associated with severe psoriasis. There is asymmetrical involvement of the distal interphalangeal joints, often accompanied by sacroiliac involvement. It may be rheumatoid-like in appearance. The latex fixation test is negative. An elevation of serum uric acid, secondary to widespread cutaneous disease is seen in twenty percent of patients with psoriasis and arthritis.

TREATMENT

The following principles of treatment should be borne in mind:

a) The disease should be explained to the patient and they should be encouraged to stay on the treatment programme.

b) No therapy should produce trauma (burns or inflammation) of the skin, since this may result in new psoriatic lesions.

c) Slow, inactive thick lesions should be treated aggressively.

d) Acute, recent, spreading lesions should be treated gently (because of the danger of precipitating a generalized psoriasis and possible erythroderma.)

Acute attacks usually clear up but complete and permanent remission is rare. Early lesions are more amenable to treatment than longstanding ones. There is no cure and prolonged treatment with any agent usually reduces its effectiveness. Supportive treatment includes adequate rest and diet with psychotherapy if needed.

The simplest treatment initially consists of daily removal of scales with soap and water and a soft brush followed by application of a keratolytic ointment or topical corticosteroid.

If a topical corticosteroid is used, a plastic occlusive dressing may keep the lesion from drying out and improve the absorption of the ointment.

The best and safest treatment utilizes tar and ultraviolet light (UVL). One to five percent crude tar ointment is applied and tar oil baths are taken before a single daily whole body exposure to UVL. Remission of psoriasis usually persists for five to eighteen months following three to five weeks of this intensive treatment.

The Goeckeman Regime is an extension of the tar and UVL therapy. The tar is used for its photosensitizing effect. In addition, a keratolytic agent (Salicylic acid) may be employed. UVL therapy alone may also be used (exposure one to three times weekly, with gradually increasing doses kept below the erythema level).

1. *Topical Therapy*

a) Tar and dithranol compounds should be used very cautiously in flexure and anogenital areas, if used at all, because of their irritating potential.

b) When topical steroids are used to initiate therapy and a clearing of the psoriatic process is obtained, a tar – or mercury – containing preparation should be used to maintain the therapeutic effect seen after steroid therapy.

2. *Systemic Therapy*

Intralesional injections of fluorinated corticosteroids (triamcinalone) produce quite promising results. Systemic corticosteroids are used in the most severe exfoliative cases unaided by other forms of treatment. The rebound phenomenon makes withdrawal of systemic corticosteroids difficult.

Methotrexate, primarily a folic acid antagonist, blocks the synthesis of DNA and proteins, interfering with the rapidly reproducing epidermal cells. The patient's hepatic, renal and hematologic status must be normal to withstand this extremely toxic drug, and side effects include leukopenia, thrombocytopenia and hepatic damage (cirrhosis). Since the proliferating epidermis is the most actively metabolizing tissue, it is inhibited to a greater extent than are other tissues. Drugs (aspirin, sulfonamides) which displace methotrexate from its albumin binding sites increase its toxicity. Methotrexate is not given to women of childbearing age who have any chance of becoming pregnant.

3. *Other Therapy*

This includes x-ray therapy (which is usually reserved for treatment of persistent nail involvement or as a last resort in severe lesions), and Grenz ray therapy. This "soft" form of ionizing radiation has no permanent effects and is used chiefly for scalp, perianal and genital lesions.

This common, papulosquamous skin disease of unknown cause and variable course has no known cure but can be managed by conscientious palliative treatment.

REFERENCES

1. Harrison's Principles of Internal Medicine, Wintrobe, M. M.; et al: McGraw Hill, N.Y.C. New York, 1970.
2. Merk Manual, Twelfth Edition, Holvey, D. N.: Merk & Co.; Rahway, N. J., 1972.
3. Synopsis of Dermatology: Stewart, W. D.; et al; Mosby Co., St. Louis, 1970.
4. Lecture Notes – Meds IIA; Archives of Dermatology, Vol. 104, Oct. 1971.

Impetigo Neonatorum

B. S. Tepperman, B.Sc., 7T5

Impetigo neonatorum, a highly infectious variant of bullous impetigo seen in newborn infants, is a superficial pyoderma of potentially serious consequence caused by various strains of *Staphylococcus aureus*. The incidence of this condition has in recent years dropped markedly in North America and Europe, but prior to the present era of antibiotic therapy impetigo of the newborn was a dreaded epidemic condition in hospital nurseries. Although it can now be effectively treated by antibiotic agents, it must still be considered a medical emergency and potential epidemic situation wherever it arises.

PREDISPOSING FACTORS, EPIDEMIOLOGY, AND BACTERIOLOGY

The skin of the newborn differs from that of a more mature child in many ways relating directly to the establishment of bacteria on and in the skin. Before birth, the skin of a fetus is covered with the vernix caseosa, a coating of sebum and desquamated epithelial cells which helps to protect the neonatal skin from bacterial infection; the vernix is lost rapidly after birth. While the vernix prevents access of bacteria to the skin of the neonate, it also maintains a neutral-to-alkaline pH on the skin surface which promotes bacterial growth and infection of the skin after the vernix begins to break down (around the fourth day of life). After this time, colonization of the skin by potentially pathogenic bacteria in the environment as well as the normal organisms of skin flora proceeds relatively rapidly. The acid pH is maintained by cutaneous exocrine and apocrine secretions, but is not usually established until after the first week of life. (Any pH shift from acid to neutral or alkaline in an older person impairs the self-sterilizing function of the skin and predisposes to bacterial infection.)

The skin of the newborn infant is generally rather thin and underdeveloped compared to that of older children and adults. The epidermis is less firmly attached to the dermis in the skin of the neonate than in older children; therefore it might be expected that vesicular or bullous eruptions would form relatively easily in the newborn in response to irritants and bacteria. As well, it must be considered that the neonate has a physiological immune deficiency which is remedied only after the first month or so of life, and is therefore less able to cope with infections.

Impetigo neonatorum is a nursery-acquired cutaneous lesion caused by *Staphylococcus aureus*, developing secondarily to colonization of the umbilicus, circumcision site, conjunctivae, nares, or rectum of the infant with a pathogenic strain. The reservoir of these pathogens is man, with the main site of carriage being the anterior nares. About 30-40% of the normal population may carry some types of coagulase-positive staphylococci in their nasal secretions. It may also be seen transiently in the skin flora of perhaps 10% of a normal population in surveys. Nursery outbreaks of impetigo neonatorum generally originate from a member of the nursery staff carrying the pathogenic bacterial strain – either asymptomatically, or in a purulent skin lesion or draining sinus. Once colonized with the pathogen, the affected infant contaminates objects in the nursery around him/her (fomitic spread), and may transfer the bacteria on contact to other nursery workers or infants, setting up a potential epidemic in the absence of proper aseptic precautions.

Newborn infants are colonized by *S. aureus* very readily. Colonization rates in infants vary widely, and may range for no apparent reason from 10-90% among 4-to-5-day-old infants in any nursery. The umbilicus is colonized earlier than the nares; male infants show higher colonization rates than females. After the fourth-to-eighth week of life, umbilical colonization is no longer seen; after the first year of life nasal carriage rates are the same as seen in the normal adult population.

Staphylococci cause impetigo neonatorum by virtue of their ability to multiply in tissue sites and produce a wide variety of extracellular products toxic to the host – coagulase, alpha-toxin, leucocidin, enterotoxin (not of interest in this disease, but a product of some *S. aureus* strains affecting the skin), and – in some strains – a skin-necrotizing toxin.

GROSS PATHOLOGY OF IMPETIGO NEONATORUM

Although the incubation period of the staphylococcal infection causing impetigo neonatorum is variable, the first lesions of the disease usually appear between the fourth and the tenth days of life. The initial lesion is a morbilliform eruption or a small vesicle on a non-erythematous base, which may be found anywhere on the patient's skin and mucous membranes except on the palms of the hands and the soles of the feet. A red or yellow macule may be observed on the skin at a site where a lesion is about to erupt. The usual locations for the lesions include diaper and intertriginous areas of the body, the face, hands, and umbilical area, and other areas of the body not covered by clothing. The initial vesicles enlarge rapidly to form large bullae containing clear yellow fluid; these bullae resemble in appearance those of a second degree burn, and are surrounded by a narrow erythematous base. (This may be contrasted with the primarily streptococcal infection of impetigo contagiosa, in which the erythematous base of the bulla is wide and indurated.) The superficial bullous forms, by accumulation of fluid beneath the stratum corneum of the epidermis, enlarges by dissection between the stratum corneum and deeper layers of the skin, until its final size may be that of a small coin (½ cm. - 2 cm. in

diameter) or even larger. New lesions may appear at this time as satellites around an older bulla.

The content of the bulla becomes turbid and purulent within 12-48 hours of the initial eruption. The bullae are thicker-walled, and rupture less easily, than those seen in impetigo contagiosa, but at about 48 hours after its initial appearance a bulla will rupture to leave a tender, moist, red base with ragged edges. Rupture is usually followed by exfoliation of the epidermis around the lesions. Crusting, as seen in impetigo contagiosa, is also a prominent feature of impetigo neonatorum. Some bullae may remain unruptured, but rather become flaccid and carry pus in the manner of a hypopyon. Rupture of the vesiculopustular lesion tends to favour its peripheral spread, and in severe cases the pathology may spread rapidly to involve large areas of the skin. The fluid exuded by a ruptured bulla may be shown by bacterial culture methods to contain only *Staphylococcus aureus* in large numbers.

Commonly, impetigo neonatorum is accompanied by purulent conjunctivitis and omphalitis, and by nasal discharge; rarely lymphadenopathy is seen. The patient often shows constitutional symptoms – weakness, malaise, irritability, leucocytosis, and disinterest in food. Often disorders of temperature regulation (usually fever, but occasionally hypothermia) and diarrhea with green, fluid stools are seen.

The child is at risk of contracting this disease for the duration of his colonization with pathogenic strains of *Staphylococcus aureus*, and indeed the disease has been known to recur after treatment. The question of factors predisposing to infection and of the epidemiology of this infection will be considered later. If improperly treated, the staphylococcal infection may lead to complications which could well prove fatal. These may include any form of more serious staphylococcal infection; complications observed include furunculosis, breast abscess, septicaemia, staphylococcal pneumonia, meningitis, nephritis, osteomyelitis, and brain abscess. Any of these complications may appear at any stage in the development of the disease, and may have rapid, fulminating, downhill courses. The essence of patient care in this disease is therefore to treat and eliminate the isolated infection before complications arise and to prevent spread to other patients.

HISTOPATHOLOGY

On the microscopic level, the lesions of staphylococcal bullous impetigo are not very much different from those seen in streptococcal impetigo contagiosum. The disease process is initiated by cocci penetrating the stratum corneum by some means. By some means, the pathogens irritate the cells of the stratum granulosum, which respond with a fluid exudate formed by exocytosis. This separates the stratum corneum from the stratum granulosum to form a vesicle which enlarges by dissection between the two layers to form an intraepithelial bulla. The underlying stratum granulosum remains largely intact. The fluid content of the bulla may be observed, on aspiration, to contain debris from disintegrated epithelial cells, some bacteria, coagulated serum, and a number of polymorphonuclear leucocytes. There will be a corresponding, but usually minor, inflammatory reaction in the upper part of the underlying dermis, with mild edema from local capillary vasodilatation and a variable infiltration of polymorphonuclear leucocytes into the tissues.

DIFFERENTIAL DIAGNOSIS

The major condition from which impetigo neonatorum must be distinguished by the clinician is bullous syphilis of the neonate. In this condition, a roughly symmetrical bullous eruption is seen mainly on the hands and the feet (including the palms and the soles, which are rarely, if ever, involved in impetigo neonatorum); this eruption is either present at birth or appears within the first three days of life. The bullous skin lesions are usually accompanied by other signs of congenital syphilis – wasting, a harsh texture and cafe-au-lait colour to the skin, snuffles and a hoarse cry, hepatosplenomegaly, and a positive Wasserman reaction.

Halogen reactions in the newborn infant may also take form of a cutaneous bullous eruption which, however, will tend to persist. Differentiation here can often be made on the basis of a careful history, which will show the administration of bromides or iodides to the mother (either pre-natally or during nursing), or of some sort of halogenated "soothing powders" to the infant out of the nursery.

Very extensive cases of impetigo neonatorum may be confused with Ritter's disease, a life-threatening skin infection seen in neonates. However, in both conditions the etiological agent is the same, and both would be treated in the same way – by topical and systemic antibiotics – so that differentiation between the two is not of major importance before effective therapy may be instituted.

Other bullous eruptions, such as pemphigus vulgaris, erythema multiforme bullosum, and dermatitis herpetiformis, may be readily confused with impetigo neonatorum (indeed, some textbooks still refer to impetigo of the neonate as "pemphigus neonatorum"). However, these conditions are comparatively rare, non-epidemic, skin diseases which may be readily distinguished from impetigo neonatorum by lesion biopsy in cases where no pathogenic organisms can be cultured from the patient.

TREATMENT

Therapy for impetigo neonatorum, depends very much on the extent and progress of the disease in the patient, and follows two paths – the taking of precautions to prevent spread and to contain outbreaks

(as detailed in the following section of this paper, "prevention"), and the steps required to cure the affected infant. Culture of exudate from crusted ulcers or of fluid aspirated from bullae and antibiotic sensitivity tests on all pathogenic or potentially pathogenic organisms isolated should be undertaken. This allows estimation of the duration of therapy and isolation for the patient, and enables the physician to plan alternate therapeutic measures should the course initially selected fail. This also allows epidemiologic studies to be carried out in the hope of finding the source of the infection and containing the outbreak.

Since the lesions of impetigo neonatorum are easily spread to unaffected sites of the patient's skin, one cardinal rule of treatment in this disease is the proper antiseptic hygiene of uninvolved areas. Usually, this means bathing the unaffected areas of the skin at least daily in mildly antibacterial baths; bathing solutions suggested include potassium permanganate 1:10000, aluminum acetate 1:20, or 3% hexachlorophene emulsion (pHisohex). (An important precaution in the use of hexachlorophene is that it must not be used on large areas of lesions; it is easily absorbed through broken skin, and if taken into the body in high concentrations is neurotoxic. Used properly, however, the associated risks are much lower than those involved with improper hygiene of the patient).

Basic treatment in mild cases consists of destroying localized bacterial reservoirs in the skin by opening bullae, removing crusts, and applying topical and systemic antibiotics. All bullae which do not open spontaneously should be ruptured artificially with a sterile needle or scalpel blade. Crusts should be removed by gentle scrubbing 4-to-6 times a day with warm water or a mild antibacterial agent (hydrogen peroxide diluted 1:4 in water, or pHisohex, again observing the appropriate precautions). After the lesions have been opened, topical antibiotic preparations should be applied every 3-4 hours until healing is completed (a process taking a week to ten days, usually). The antibiotic usually suggested is a bacitracin ointment; however, painting the skin with 2% gentian violet has also been recommended by various authors. As always, the usual considerations in choice of a topical antibiotic agent – pathogen sensitivity, possibility and potential consequences of patient sensitization to the drug and likelihood of selection for resistant strains within the lesion – must be taken into account.

In mild cases – a few small, localized lesions in readily accessible areas with no ecthyma and no indication of systemic complications – the topical therapy outlined above may be sufficient treatment by itself. However, the risk of systemic complications and their consequences is sufficiently serious that it is usually advisable to administer systemic antibiotics as well. Early diagnosis and systemic antibacterial treatment are by far the best preventive measures against systemic complications of the disease. Topical therapy is relatively slow, and does not affect pathogens carried in other sites of the body which could perpetuate the infection. Any extensive infection, with or without systemic manifestations, demands prompt maximal treatment with appropriate systemic agents.

In any case, if systemic therapy is not initiated at the onset of the disease (by far the best course), it must be started if the disease shows any sign of spread after topical therapy is begun, or if the lesions do not improve after four days of topical treatment. Choice of systemic antibiotics must depend on the results of bacterial sensitivity studies. A single dose of benzathine penicillin 600,000 units intramuscularly is effective against non-penicillinase-producing staphylococci in some cases; more protracted courses of procaine penicillin G are useful in severe infections with penicillin-sensitive organisms. If the organism is penicillin-resistant, or if sensitivity studies have not yet been reported, the agents of choice are the penicillinase-resistant penicillins, such as methicillin; erythromycin, lincomycin, and cephalosporins have also been suggested as effective.

The appearance of impetigo neonatorum should immediately alert the staff physicians to the presence of a major staphylococcal problem in the nursery. This brings us to the final topic of this paper – the prevention of the disease and the containment of outbreaks.

PREVENTION

The occurrence of two or more concurrent cases of impetigo neonatorum related to a nursery, or a single breast abscess in a nursing mother or infant, is presumptive evidence of an outbreak of impetigo neonatorum. All lesions should be cultured to determine antibiotic sensitivities and the phage type of the epidemic strains. All nurses, aides, attendants and physicians with access to the nursery area should be examined for staphylococcal lesions anywhere on their body. Casual visitors should, of course, be excluded from this area. All staff members with minor staphylococcal lesions of any sort – pustules, boils, abscesses, conjunctivitis, severe acne, otitis externa, lacerations – should be barred from the nursery and obstetrical areas of the hospital until cured. Nasal swabs taken from all persons with access to the nursery should be cultured, and asymptomatic carriers of the epidemic strain should be excluded from the nursery and treated until further cultures are negative. In many, carriage of the epidemic strain will be transient; the colonization will be lost if they are removed from the nursery area, or if the predominant staphylococcal strain in the nursery is deliberately changed by bacterial interference. In 60-80% of permanent carriers, carriage of the epidemic strain may be eliminated by antibiotic regi-

mens followed by deliberate recolonization of the nares with selected, less-virulent strains of *Staphylococcus aureus*. If artificial recolonization is not used, treated carriers may be recolonized with the epidemic strain within 2-4 weeks of the ending of antibiotic therapy. Periodic surveys of staphylococcal colonization of infants and nursery personnel may help in identifying incipient outbreaks.

Impetigo neonatorum is now seen most in hospital nurseries in epidemic outbreaks, and is an indication of lax aseptic technique exaggerated often by inadvertent selection for antibiotic-resistant staphylococci. Uncolonized infants obviously cannot contract the disease. However, the colonization rate in infants in a nursery often fluctuates widely for no apparent reason. Because of this, Shinefield[1] has suggested that strict asepsis in the nursery, vigorous environmental control (for instance, use of ultraviolet lighting), rooming the newborn infant with its mother instead of in a crowded nursery, or even the closing of affected nurseries cannot be consistently relied upon for prevention of colonization. However, institution or reinforcement of these measures do help to some degree in containing pre-existing outbreaks, and the abandonment of any of these measures does increase the likelihood of an outbreak taking place[2].

Proper hygiene is important in preventing colonization of uninfected infants in the nursery and spread of the disease. Infants should be washed meticulously with 3% hexachlorophene emulsion immediately on delivery, again on their arrival in the nursery, and daily thereafter; this procedure is effective in reducing the incidence of umbilical and cutaneous colonization with *S. aureus*, although nasal colonization remains unaffected. If not overdone, the risks associated with the use of hexachlorophene are minimal. Particular attention should be paid (for reasons outlined earlier) to the removal of the vernix caseosa from the body folds and from the base of the umbilicus. These measures are usually effective in reducing colonization rates (use of less concentrated hexachlorophene preparations, such as 0.75% hexachlorophene bar soaps, renders the procedure less effective), but do not contribute to the control of infection in infants already colonized with pathogenic strains.

The disease is spread rapidly from colonized infants. Overcrowding of nurseries is therefore to be avoided, and rooming-in is suggested as much as possible. Nursery personnel should meticulously observe aseptic precautions such as hand-washing when handling infants, and generally should handle the infants as little as possible. Outside or cohort surveillance of nursery practices often helps to recognize flaws in aseptic procedures that could lead to outbreaks. Nurseries should be thoroughly cleaned and disinfected regularly.

One means suggested for controlling colonization with *Staphylococcus aureus* currently under investigation is bacterial interference – the intentional colonization of the umbilicus and nares of an infant within the first two hours of life with a selected, competing less-virulent strain of *S. aureus*[1, 2, 3, 4]. This method allows prompt termination of outbreaks of infections with hospital strains of staphylococci, but is not recommended as a routine procedure because the organisms used are still coagulase-positive staphylococci, still potentially pathogenic. This method is therefore currently indicated only in epidemic outbreaks where colonization and disease rates are both high.

All known or suspected cases of active staphylococcal infection in the nursery, and all known contacts, should be isolated from unexposed infants in the nursery and from each other. Isolation must be continued until all lesions are healed; this period of time depends on the size, number, and distribution of lesions, the virulence of the organism, and the treatment program used. Nursery personnel attending the infected infants must not come into contact with healthy neonates. All contaminated clothing, bedding, and dressings must be either adequately sterilized or destroyed. All utensils and other objects contacting the infected infants must be thoroughly disinfected, and in all cases must be kept separate from the utensils used in the handling of healthy infants. In any outbreak, as a standard procedure, the nursery should be washed down with an iodinated phenol or similarly strong disinfecting detergent, and all utensils, linens and other permanent objects in the nursery must be autoclaved, boiled, or otherwise disinfected before new patients are admitted. Finally, the rate of colonization and infection of infants may be decreased markedly by simply the avoidance of any traumatic procedures – such as circumcision – on the infants confined to the nursery.

Many of these measures fall under the heading of pure "common sense"; but unless they are conscienciously observed, prevention and suppression of outbreaks of impetigo neonatorum becomes extremely difficult.

REFERENCES

1. Shinefield, H. R. "Staphylococcal Infections" (chapter 7, pp. 1-4) in "Brenemann's Practice of Paediatrics", vol. 2, ed. Kelley, V. C. Harper and Row, Hagerstown, Md., 1972.
2. Albert, S.; Baldwin, R.; Czakajewski, S.; von Saltsbeger, A.; Nachman, P.; Robertson A.: "Bullous Impetigo due to Group II *Staphylococcus aureus*" American Journal of Diseases of Children, vol. 120 No. 1, pp. 10-13 (July 1970).
3. Light, I. J.; Walton, L. R.; Sutherland, J. M., et al. "Use of Bacterial Interference to Control a Staphylococcal Nursery Outbreak" American Journal of Diseases of Children, vol. 113, pp. 291-300 (1967).
4. Shinefield, H. R.; Ribble, J. C.; Eichewald, H. F.; Boris, M.; Sutherland, J. M., et al. "Bacterial Interference – Its Effect on Newly-Acquired Infections with *Staphylococsus aureus*". American Journal of Diseases Children, vol. 105, p. 646 (1963).

A Review of the Diseases of the Nail

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Although the majority of complaints concerning nail deformities are for cosmetic reasons, the nail does serve a protective function. Nail defects may result in pain and decreased ability to appreciate fine touch. Nail diseases are manifested by relatively few symptoms, so that it is common to find a similar clinical "picture" associated with several different conditions. The nails may be affected by 1) primary nail diseases, 2) any dermatitis that involves the surrounding skin, or 3) many internal diseases.

PRIMARY NAIL DISEASES

The nails may be altered by diseases specific for them alone. These changes may be due to 1) trauma, 2) genetic abnormality, or 3) local infections.

1. TRAUMA

a) *Mechanical injury* to the nail often results in a hematoma with the damage and pain proportional to the injury inflicted. Soon after the trauma a small hole may be made in the nail plate, in order to relieve pressure. There is often partial or total temporary shedding of the nail, usually followed by the growth of a normal nail. The great toe nails may be repeatedly shed as a result of recurrence minor injuries such as those occurring in athletics. If the matrix area is severed, the damage may manifest itself as a permanent longitudinal split the length of the nail, months after the initial injury. This can be avoided by removal of the nail plate and suturing of the matrix early on. A similar injury of lesser degree produces permanent ridges on isolated nails. Damage to the matrix may cause one or more longitudinal bands of pigmentation of the nail plate especially in heavily pigmented persons. The condition may be temporary or permanent. The sudden appearance of these pigmented bands in white persons suggests the development of a junctional nevus in the matrix which can be diagnosed by a punch biopsy of the matrix.

b) *Contact Reactions*

The use of various nail cosmetics may result in several nail changes. "Base coat" has been associated with thickening and loosing of the nail plate; artificial nails and press-on type covering have resulted in splitting of the distal ends of the nail. Allergic sensitivity to chemicals in cosmetic preparations are manifested as a contact dermitis on the neck and eyelids, but the nails themselves do not react. The contact dermatitis of the subungual and paronychial area is often caused by formalin. Stick-on nail dressings contain imporous substances that interfere with the moisture exchange between the nail plate and its surroundings. When removed, small bits of nail adhere to the chemical, leaving the nail surface irregular. Many splits may develop, and separation of the nail from its bed (onycholysis) occasionally occurs. The causative agent should be discontinued and topical steroids applied until a normal nail grows in.

c) *Nail Biting*

This is a common nervous habit of children and adults. The patients usually freely admit they are nail biters. This habit may affect both nails and cuticles causing chronic trauma to them and producing great distortion of the nail. Bitten nails appear irregular and very short. The biting may even encroach on the matrix area producing deformity. Cuticle biting often results in minor attacks of paronychia. Periungual warts are an important complication of nail biting. It is difficult to stop this habit. Local application of distasteful chemicals to the nail seldom helps. It is of interest to note that many children with this habit have one parent who is also a nail biter. Sometimes if little attention is paid to this tic, the biting stops.

d) *Hang Nails*

These consist of small cutaneous tags that split from the lateral nail fold. Hang nails are common in nail biters but may also be caused by accidental injury. The skin flaps may extend into the deeper skin, causing bleeding and a painful area that is susceptible to bacterial infection. The hang nail should be removed with sharp scissors. Treatment of bacterial infection includes hot soaks, application of topical antiseptic tinctures or ointments, no covering dressings, and, if severe, systemic antibiotics.

e) *Habit Tic of Nails*

This is a nervous habit caused by drawing one or more fingers of the same hand across the nail plate at the dorsal nail fold. It causes a depression a few mm. wide down the centre of the nail from the cuticle to the free edge of the nail. Cross ridges extend out from the depression to the nail edges. If less force is used in the trauma, the depression may be absent. It is commonly seen on one or both thumbs; occasionally seen on another finger. The patient rarely attributes the nail change to this habit which is difficult to break. One must differentiate this from median dystrophy causing splits down the nail, dermatitis with its irregular ridges, and other trauma as in over zealous manicuring.

f) *Fragile Nails*

A common complaint among women is the distal splitting of nails through the thickness of the nail. This splitting may have several causes: (1) trauma, especially with longer nails, (2) nail polishes and solvents used to remove the polish may be overly drying, (3) repeated wetting and drying. The latter decreases adhesion between cells of the nail plate causing splits. Also, the nails can become soft since the hard keratin comprising the nail can absorb 30% of its dry weight in water. To avoid these

problems, the nails should not be wet excessively and should be kept short. Although nail polish may cover the defect, oily polish removers should not be used. Treatment with daily oral ingestion of gelatin (one envelope per day for at least three months) is debatable.

2. GENETIC ABNORMALITIES

a) *Ingrown Nails*

The ingrown nail may be caused by growth of the lateral edge of the nail plate into the adjacent skin groove, or by a simple uncurved nail. In the former case, a pointed spicule of nail attached to the lateral portion of the nail (as a result of incorrect nail trimming) pushes into the soft tissues as the nail plate grows forward. The result is discomfort and slight local sepsis. The condition progresses with more severe infection, increased pain, redness, swelling and granulation tissue formation in the lateral nail fold. Therapy includes removal of the nail sliver with a straight edge nail cutting forceps under local anaesthetic, warm soaks, and local or systemic antibiotics depending on the extent of infection. When the infection has cleared, cotton or wool may be gently introduced under the corners of the nail in order to raise the pointed corner above the skin surface. Granulation tissue can be cauterized with silver nitrate. This conservative management will obtain a cure in about six weeks. For more resistant cases, or with cellulitis and increased pain, more drastic treatment may be employed: removal of overlaying skin by excision and suture or removal of the lateral portion of the nail back to the nail base with or without destruction of the base by electrosurgery. The lateral aspects of the simple curved nail point inwards, resulting in tenderness and pain. Therapy consists of packing, as with a "true" ingrown nail. Prophylactic management should include the wearing of properly-fitting shoes. Nails should be trimmed straight across, so that the corner lies above the skin groove.

b) *Excess Curvature*

Severe discomfort of the great toes or thumbs may be caused by excess curvature through the long axis of their nails. This curvature results in partial strangulation of the soft tissues of the distal phalanx There is often no associated trauma or apparent cause. Treatment consists of removal of the nail plate.

c) *Onychogryphosis and Hypertrophy*

In onychogryphosis the nails are thick, curved and very difficult to cut. Trauma is the cause in some cases, development abnormalities in other cases. Damage to the nail continues as the nail grows longer. In young patients, the nail may be removed and allowed to regrow. The nail may be destroyed permanently by destruction of the matrix. In older patients, especially the elderly, regular chiropody is necessary.

Although developmental anomalies of the nails are rare, a vast array of these congenital abnormalities has been reported, often associated with other developmental defects.

d) *Anonychia*

This autosomal dominant trait is an extremely rare abnormality with complete or almost total absence of of the nails. The individual is born lacking nails on the fingers and toes, or with imperfect nails that are shed and not replaced. The nail beds are normal and smooth in texture. All or any of the nails may be involved. Isolated cases may be related to maternal illnesses in the first trimester of pregnancy. The defect is permanent with no effective treatment.

e) *Onychatrophy*

In this anomaly the nails are short in size, varying from ¼ to ¾ of their usual length, and improperly developed. The nail plates are laminated and thin with transverse longitudinal grooves or edges commonly present. The surface of the nail may appear "moth-eaten", due to pitting and depressions. The nails are opaque, dull yellow in colour and without lustre. They are brittle and crumble easily. There are no free edges, since the nail beds overlap ends. Onychatrophy may be a congenital or acquired disease. It is often associated with other abnormalities: absent or rudimentary patellae and arthrodysplasia of the elbow joints and iliac horns. This is the "nail patella syndrome". Onychatrophy is transmitted as an autosomal dominant characteristic. Therapy cannot alter the condition.

f) *Koilonychia*

This nail disorder causes a smooth spoon-shaped nail. A few cases have been reported with koilonychia as a dominantly inherited characteristic. Treatment is not satisfactory.

g) *The Racket Nail*

The racket nail (nail en raquette) is seen as an abnormally wide nail with its transverse curvature decreased so that the nail looks flat. The thumbs are usually affected, although there have been cases with normal thumbs and bilateral or unilateral involvement of the other fingers. The ratio of affected males to females is three to two. Psoriasis or seborrhea have accompanied this nail change occasionally. It appears to be inherited as an autosomal dominant trait.

h) *Leukonychia*

Leukonychia, a white discolouration of the nails, is divided in three classes: punctate, striata, and totalis. The latter two frequently are inherited traits. Females are affected more often than males, and all races are involved. The punctate and striate forms are common, the totalis rare. In leukonychia striata, white transverse

lines grow forward from the lunula to the free edge of the nail. In leukonychia totalis the entire nail plate appears bluish-white, although otherwise normal. The abnormality is present from birth, but leukonychia totalis may temporarily disappear. In both the striate and total forms, any number of nails (often only the fingernails) may be affected. In most cases, other genetic abnormalities are found. Trauma is a factor in the causation of leukonychia striata, but is not associated with leukonychia totalis. Most varieties of leukonychia are transmitted as dominant characteristics. The condition is not altered by treatment. Familial leukonychia should be differentiated from acquired complete whiteness of the nails seen in anemia, leprosy, hepatic cirrhosis, ulcerative colitis, and some long-standing febrile illnesses. Most authors favour the theory that leukonychia is due to imperfect keratinization.

3. LOCAL INFECTIONS

Since the nail is an appendage of the skin, it may become affected by any disease of the skin adjacent to it. However, whereas a remarkable improvement of a dermatitis of the skin may be noted soon after treatment is initiated, several weeks may be required before the nails are restored.

a) *Fungal Infection (Tinea Unguium)*

Disturbance of nail growth due to fungi is an extremely common problem. Fungus infections will deform the nail in several ways. The earliest sign is usually a brownish discoloration at the edge of the hail since the infection reaches the nail plate from the nail bed. This may later spread, involving the whole nail. The nail becomes soft and pieces may break away. The nail may become thickened; the nail bed may become irregular and thickened. The nail may separate from the nail bed. Air spaces in the nail plate, formed as a result of cracks, cause white patches on the nail. Sometimes small hemorrhages may be visible through the nail plate. Rarely the nails are shed. A number of dermatophytes may infect the nail; the more common ones are *Trichophyton rubrum*, *T. mentagrophytes*, and *T. sulphureum*. Others seen less often include *T. schoenleinii*, *T. magninii*, *T. violaceum*, and *Epidermophyton floccosum*. Diagnosis is suspected by clinical appearance, and is confirmed by microscopic examination of nail clippings that have been soaked in 5% potassium hydroxide for 24 hours. Filaments can be seen in the nail plate. A culture may also be made. The majority of nail infections can be successfully treated with griseofulvin tablets, although patience is required. Treatment must be continued for several months or even years, depending on the growth rate of the nails. When toenails are involved, these may be surgically removed and treatment with griseofulvin started at the same time.

b) *Chronic Paronychia*

In persons whose hands are constantly exposed to moisture, chronic paronychia is very common although the causative factors are not clear. Usually the initial alteration is a loss of the cuticle from all or part of the nail, as a result of maceration in water or trauma. This allows the space between the posterior nail fold and the nail plate to open and become colonized by Candida species, often *Candida albicans*. If a bead of pus is present or if the keratin of the under surface of the posterior nail fold is gently scraped, monilia can be found. Secondary infections with varying bacteria may cause acute exacerbations and considerable discomfort. One or more nails may be involved. In the early stages the nail plate is normal; later the edge become irregular and discoloured brown or black. The nail may become cross-ridged. In the late stages of the condition, the size of the nail is reduced considerably, and this appearance is exaggerated by swelling of the surrounding soft tissues. Most of the nail deformity is the result of inflammation in the matrix area which interferes with the growth of the nail. The discolouration may be caused by bacteria. The condition may persist without treatment for several years. Many forms of treatment have been recommended, but no single remedy will work in every case. The hands should be kept as dry as possbile. Nystatin ointment helps in some cases; Onychophtex is useful in others. A quaternary ammonium compound may also be used. Any treatment must be continued for weeks or months, until all swelling has subsided and the cuticle restored. In some cases a complete cure cannot be obtained. Rarely the nail plate is removed, if it is great care must be taken during regrowth of the nail. An antiseptic cream should be used and the area protected from further maceration. Infection of the nail plate with *Candida albicans* is a complication of chronic paronychia that may remain when all evidence of the paronychia has subsided. If culture reveals infection with *Candida*, treatment includes amphotericin B lotion and nystatin ointment.

DERMATITIS

Any type of dermatitis involving the hands, especially the skin adjacent to the nail, may cause alterations of the nail. The usual change is an atropic process with the development of irregular ridges and coarse pitting. One or several nails may be affected. Deep ridges cause temporary shedding of the nail. In the early stages, only the proximal part of the nail will be involved. Although the usual change is an atrophic process, sometimes gross hypertrophy occurs. In these cases there is inflammation of the nail fold, and the nail becomes thick and irregular. Onycholysis is often associated with dermatitis of the fingertips. Those who rub their hands on their skin to obtain relief from itching will develop highly polished nails. Treatment is essentially that of the dermatitis. The nails will not

appear normal in less than three months, since their rate of growth is about one mm. every ten days.

SYSTEMIC DISEASES

1. *Psoriasis*

Psoriasis is one of the commonest skin disorders. Psoriatic nail changes occur with or without skin involvement in 10 to 60 per cent of psoriatics. This accounts for psoriasis being the most important single cause of nail dystrophy. Nail abnormalities associated with psoriasis may be varied. The most widely recognized characteristic is stippling or punctate pitting in the distal nail bed. Various degrees in the size and pattern of pitting may be seen. A regular type of pitting is sometimes associated with alopecia areata. Differential diagnosis of the irregular nail pitting should include dermatitis and chronic paronychia.

Separation of the nail from its bed, onycholysis, is associated with psoriasis almost as often as pitting. There is often partial separation involving one or several nails. A yellowish margin usually peculiar to psoriasis may be visible between the normal pink nail and the separated white region. Onycholysis may appear suddenly, even overnight, when it is due to an alteration in the nail bed, and not to changes in the nail matrix area. Occasionally the proximal part of the nail bed with the nail still attached becomes raised above the distal part so that the nail is very widely separated. The patient is then forced to cut the nail very short. Onycholysis may be associated with fungus infections, circulatory disorders, trauma, drug eruptions, local irritation from chemicals, hyperhidrosis, and thyroid disorders. Some cases are of unknown origin and a few are developmental.

Another symptom of psoriasis is gross abnormality of the nail plate due to changes in the matrix. The nail becomes opaque, discoloured, irregular, thickened, and loses its lustre. One or several nails may be involved to varying extents. The abnormality moves forward from near the cuticle to involve the whole nail plate. There is often a changing pattern of nail involvement; an affected nail may return to normal, a normal nail may become involved. The nail bed is also involved since minute hemorrhages below the nail plate causes a colour change. The thickening of the nail is due to keratin derived from the nail bed being incorporated into the nail plate. This abnormality must be differentiated from fungus or monilal infection of the nail plate. In the latter, one can demonstrate the organism in potash preparations. The nail plate is usually softer than in psoriasis.

Occasionally overcurvature of one or more nails may be seen. Hard material may form at the nail edge causing the nail to lift from its bed. Arthropathy of the distal interphalangeal joint may be seen. The arthritis is of a destructive type. Although not the same as rheumatoid arthritis, x-rays show destruction of the distal phalanx.

Treatment of psoriatic nails is unsatisfactory. The condition may improve spontaneously. Improvement of severe nail changes often occurs after repeated triinacinolene injection into the matrix area. Nails may improve with the application of 0.025% fluocinolone acetonide of 0.1% triamcinolone cream under polythene dressings. X-ray therapy will occasionally induce a remission which may last years. The dose necessary is 100r. at 60 of 70 k.v. repeated at weekly intervals to a total of 400 to 500r. This mode of treatment should be repeated no more than twice in a patient's lifetime. The nail changes in pustular psoriasis and acrodermatitis are the grosser changes seen in psoriasis.

2. *Impaired Circulation*

The nail is easily damaged by a reduction in its blood supply, and may react in a number of ways. Raynaud's symptoms of a number of years duration causes the nail plate to become thin and longtitudinally ridged. Splits develop along the ridges, and the nails become brittle. The colour of the nail bed shows more clearly through the nail plate so that the nail appears redder than normal. The rate of nail growth is near the lower limit of normal. Permanent shedding of the nail with scarring may also be seen. Onycholysis is present at times, as is overgrowth of the cuticle and its fixation to the nail plate. The treatment of these disorders is the treatment of the underlying condition.

3. *Beau's Lines*

Beau's lines are transverse furrows visible on the surface of the nails. These are attributed to malnutrition or dysfunction of the nail matrix during any of a large group of systemic disturbances which temporarily alters the rate of growth of the nail plate. The growth disturbance does not become manifest for some weeks after the damage has been inflicted, and moves gradually from near the lunula to reach the free border of the nail in approximately three months time. The width of Beau's lines varies directly with the duration of the internal disease. If interference with the nail's nutrition is severe, the depression may extend through the nail plate causing temporary shedding of the nail. Measles commonly interferes with the rate of nail growth in young persons. Conditions associated with Beau's lines include many of the acute infectious febrile diseases such as malaria, syphilis, pulmonary tuberculosis, coronary disease, collagen diseases, pregnancy and emotional shock. Lines that appear on isolated nails are usually due to local causes. They may be seen in patients with Raynaud's symptoms following exposure to extreme cold. Similar lines may be associated with dermatitis, although they are more irregular and tend to recur.

(Continued on page 43)

Treatment of Acne Vulgaris

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INTRODUCTION

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous follicles characterized by comedones, papules, pustules, cysts and occasionally nodules in the sites of predilection, namely, the face, the upper back and chest and infrequently the upper arms. Although it persists in 10% of the adults aged 30 to 40 as acne rosacea, it is a disease of adolescents with some 80% of all teenagers being involved to some degree before attaining adulthood.

The basic lesion in acne vulgaris is the *comedo*, commonly known as the blackhead. It is produced by the increased viscosity of the sebum, as well as by intrafollicular hyperkeratinization. As a result, there is increased sebum and keratin production which block and dilate the follicular orifice. Oxidative changes cause darkening of the upper portion of the comedo resulting in the "blackhead". It is well known that the density of comedones is directly related to the severity of acne[4].

The formation of inflammatory papules and pustules is brought about by changes in the walls of the sebaceous follicles, with their subsequent rupture. This produces a parafollicular inflammatory reaction in the subjacent dermis. The fatty acids that are formed in the follicular material are believed to be the mediating factor in the inflammation of follicles.

Bacterial infection also plays an important role in the parafollicular and follicular inflammation. The 3 organisms found singly or collectively in most acne lesions are *Corynebacterium acnes*, *Staphylococcus aureus* and *Staphylococcus albus*. These organisms produce bacterial lipases which cause a breakdown of lipids into short chain free fatty acids (FFA) which induce a non-specific inflammatory response of the skin. *Pityrosporon ovale* also contain lipases that are capable of releasing FFA from the sebum in the follicular duct. The role of bacteria in acne will be dealt with in detail later on. There is no neural control of the sebaceous apparata, but hormonal influence is undoubtedly present. Androgens have been shown to stimulate sebaceous gland activity and hence increase sebum production. On the other hand estrogens and progestogens antagonize the androgen effect and suppress sebum production. This principle is employed as one of the therapeutic methods in acne. The efficacy of this form of treatment will be discussed in a later section.

Acne vulgaris can be classified into 4 grades:–

Grade I – increase in oiliness and comedones
Grade II – grade I with papules and pustules
Grade III – larger and deeper pustules – often fairly localized
Grade IV – extensive systic acne involving face, neck and upper trunk (acne conglobata)

TREATMENT OF ACNE VULGARIS

There is really no regularly effective method of treatment of the extremely common chronic disease acne vulgaris. The principle of treatment of acne is, first of all, to understand its etiology and pathogenesis. Treatment is aimed at eliminating the comedones, a measure of the efficacy of acne therapy, by reducing sebum production as well as by the elimination of bacterial flora populating the sebaceous follicles.

Depending upon the severity of the disease, treatment varies from frequent cleansing of the affected areas, topical applications of mild lotions, to surgery and systemic therapy with hormones, corticosteroids and antibiotics. A summary of the appropriate treatment of the various grades of acne is given at the end of the discussion.

A good understanding of the pathogenesis of the disease is imperative for the patient. The principles of therapy should also be clearly explained to the patient. Good therapeutic efficacy can only be achieved with full co-operation of the patient.

The first thing to tell the patient is the relationship between the psyche and the skin disease. It has long been known that in adolescents, acne flares up before school examinations or when they are under stress. Emotional impact plays an important role in the treatment of many skin diseases and acne is one of them. Insomnia, tension from work, nervousness and fatigue are only some of the emotional factors that aggravate the acne condition. Thus it is useful to ask the patient to avoid as much emotional stress as possible.

As with most skin disease, cleanliness is another important fact that the patient should bear in mind. Cleansing of the affected areas 2 or 3 times a day not only removes the oiliness of the skin, but also reduces the normal skin bacterial flora.

The patient should be advised to avoid picking the lesions and blackheads since this will only invite secondary bacterial infection. The fingers are normally loaded with a wide spectrum of bacteria, some of which are pathogens. Picking the lesions with the fingers will auto-inoculate the bacteria into these lesions, Furthermore, picking probably spreads FFA to other skin areas causing inflammation. As a result, the normally sterile acne lesions become pustules or furuncles and this will further complicate the treatment.

Occupational exposures to oily substance, chlorinated hydrocarbons and coaltar distillates may cause acneiform eruptions in individuals without acne and will perpetuate the lesions in acne patients, and must be avoided.

Warmth and humidity also cause exacerbations of more severe types of acne. Thus it is necessary to

increase the therapeutic regime if the patient is active and perspires easily.

Diet

For many years, physicians and the mass media have perpetuated the idea that chocolate is acnegenic. Nuts, cola drinks, dairy products and fried food are also commonly blamed.

An interesting study was carried out by Anderson[1] which challenges the popular claim that certain foods can cause acne. The subjects were college students of similar age and health. They were given large amounts of cola drink, chocolate and nuts for one week to determine whether these food could provoke or aggravate acne. These subjects were examined for their acne conditions for 10 days. This study showed that there was absolutely no major flareup of acne produced by foods. Only a third of the subjects developed new lesions, whereas almost half of the subjects showed slight improvement in their acne. Anderson concluded from this study that diet as a method of acne treatment was over-rated. One should note, however, that Anderson's data is biased in the sense that the study is not of the double-blind type. Moreover, he has not tested all the foods commonly claimed to be acnegenic. The effects of coffee, tea, ice cream, spices and alcohol on acne remain unclear.

Nevertheless, it still seems advisable to the patient that they should be aware of the fact that food can cause acne. Hence, they should avoid those foods, if any, that they find could provoke acne.

In contrast to food as a cause of acne, some people believe that some foods can alleviate acne, such as foods that are rich in vitamin A. Unfortunately a double-blind study showed no significant difference between patients receiving oral vitamin A and those receiving the placebo[11].

Peeling Agents

A variety of therapeutic modalities essentially function by producing erythema and desquamation. They probably act in part by producing an increased rate of turnover of the horny layer lining the follicular duct, thus reducing the compaction necessary to produce the comedo. This will unseat the comedo from its secure anchorage in the follicular duct, allowing easier mechanical removal and/or precipitating spontaneous shedding. Thus peeling agents will hasten the resolution of papulopustules by reducing the quantities of comedo.

Peeling agents include:—

1. Cleansing agents
2. Sulphur
3. Topical corticosteroids
4. Acne preparations
5. Topical retinoic acid (vitamin A acid)
6. UV light and x-rays
7. Cryoslush therapy

The properties and efficacies of these peeling agents will be discussed separately. The topical peeling agents will first be dealt with, followed by the other peeling agents.

Cleansing Agents

The frequent use of any cleansing agent as ordinary soaps, medicated soaps and detergent bars will help to dry, and remove oiliness from the skin. The affected area should be cleansed at least twice a day to prevent blackheads. The various cleansing agents available on the market do not differ significantly from each other in their efficacies despite the diversity of ingredients. Many of them (Dial, Acnaveen soap, etc.) contain antibacterial agents as well. The effectiveness of topical antibacterial agents will be discussed elsewhere.

Sulphur

Sulphur has been regarded by many standard dermatology textbooks as the most effective topical remedy[3, 9, 14]. It is a classic peeling agent having keratolytic, antibacterial and antioxidizing properties. Recently Mills and Kligman[7] examined the role of sulphur in acne-treatment. In contrast to the classical belief, they considered elemental sulphur, but not sulphur compounds, as harmful in acne. They demonstrated the comedogenic effect of suspensions and cream containing elemental sulphur in rabbit ears and on human backs. They proposed that sulphur has a dual paradoxical action in acne: one in which it is benign, one in which it is harmful. Sulphur on the one hand only hastens the regression of visible papulopustules, which makes it an overrated acne remedy. On the other hand, it promotes the formation of new comedones from which inflammatory lesions may develop, and this is contraindicated in acne. Furthermore the sulphur-induced comedones were found to contain masses of *C. acnes*. This raises doubt with regard to the antibacterial property of sulphur.

Interestingly enough, sulphur compounds like thiosalicylic acid and sulphides do not seem to provoke acne. In addition to sulphur, resorcinol, salicylic acid, benzyl peroxide are used as peeling agents.

Topical Corticosteroids

Topical corticosteroids are generally indicated for acne patients. They are used primarily for their anti-inflammatory property. They will help to alleviate the irritation of the inflamed lesions. As has been mentioned previously, inflammation of the acne lesions is mediated mainly by the free fatty acids accumulated in the follicles. It is obvious that the use of corticosteroids only gives symptomatic relief and does not cure the lesions. Furthermore, these drugs may present side-effects although the incidence is low.

Acne preparations

The majority of acne preparations contain one or more of the following ingredients:

1 - 4% resorcinol
2 - 8% sulphur
1 - 2% salicylic acid
benzoyl peroxide
corticosteroids and various antibacterial agents.

All topical acne lotions produce varying degree of dryness and scaling and probably some degerming of the skin surface. The critical point in their use is to achieve a mild erythema and peeling. Small, very superficial pustules may be dried and cast off, but there is little evidence that topical preparations affect closed comedones and deeper cysts. Hence acne preparations are primarily used to treat grade I and grade II acne. They may also be used to treat grade III acne in conjunction with systemic therapy.

Velminckx Compresses

Hot compresses of dilute velminckx (sulphurated lime) solution are claimed to be very effective in producing dryness and peeling of the acne lesions. The compresses should be applied twice a week for 20 minutes. Usually each 2 teaspoonfuls of the solution is diluted with 500 ml of hot water and the diluted solution is applied to the skin with a towel.

Retinoic Acid (vitamin A acid)

Another topical medication recently suggested for acne treatment is retinoic acid or vitamin A acid[6]. This drug has recently received much attention. Several reports in the current literature[5, 7, 10] strongly favour the use of this drug in preference to other topical medications. Retinoic acid is an irritant to the skin, and its effect on comedones appears to be related to irritation of the follicular epithelium. The follicular lining of comedones treated with vitamin A acid shows increased proliferative activity, manifested by acanthosis and parakeratosis. It has been demonstrated that there is an increase in activity of the basal layer, having a turnover time of 3 days and this reflects an irritated epidermis. The result of this increased follicular turnover is the production of loose, less coherent horny material which is then able to be desquamated through the follicular orifice. Thus it is an effective agent in ridding the follicles of horny impaction from acne vulgaris. Continued use of this is necessary to prevent the reformation of a horny plug.

In a recent paper reported by Pedace and Strougton[8], the effect of topical retinoic acid in acne patients was compared to a placebo in a double-blind study. Results showed that 90% of the patients treated with the placebo showed a poorer response. These investigators used a decreased comedo count over a confined area of the skin as a measure of acne improvement. Minimal side effects were noted by these and other workers, the main one being erythematous eruption which may develop into pustules. However the incidence is low.

The usual dose of topical retinoic acid is 0.05% to 0.1% in a propylene glycol alcohol base.

How to apply the topical medications

The patient should be instructed carefully to rub a small amount of the various preparations into the skin, spreading it as far as possible. The application is best made after a bath or when the skin is clean and debris has been removed. The medication should be reapplied according to their required frequencies. It is important to stress that the agent be rubbed in well to obtain maximal efficacy.

Other peeling agents

Ultraviolet light treatment

UV induced peeling of the skin is of value in acne vulgaris, especially when comedones are profuse and superficial, acutely inflamed papules and nodules. There are 2 sources of UV light, natural and artificial. The patient should be encouraged to expose himself to sunshine (provided that his skin is not photosensitive). With the artificial source, the patient is treated in a reclining position. The eyes are protected with goggles, or with water-moistened cotton pads. The UV light is usually given at a fixed distance, about 2 feet, from the skin. The dose of UV light varies from patient to patient and it is determined on a trial-and-error basis. Each UV exposure should be long enough to produce erythema of the skin under treatment. This will later be followed by a fine dry exfoliation of the epidermis. The patient should be informed of the incidence of an erythema and carefully acquainted with its duration and the subsequent peeling. This therapy is indicated for grade II and III acnes.

X-Ray Therapy

The efficacy of the other therapeutic methods has rendered this treatment obsolete. In the past, this treatment was used for patients with severe acne (grade IV) and when other treatments appeared unsuccessful. The classical dose of x-rays given was 70 R weekly. A total dose of 800 R should not be exceeded. This treatment has serious hazardous side effects and explains why it is not used presently on acne patients.

SURGICAL TREATMENT

1. *Local surgery*

Local surgical treatment is vital to bring about quick resolution of the comedones and pustules as well as the cysts.

The comedones are expressed using a comedo extractor. It is well documented that surgical removal of comedones improves the acne tremendously. The patient himself or his family members can remove the comedones. This treatment is not only simple and inexpensive, it proves to be a more reliable treatment method.

In severe acne (grades III and IV), cysts that are present can be excised and drained. Scarring, however, is usually produced by this procedure. Instead intralesional corticosteroids are often injected to facilitate resolution of the inflamed lesions in grade IV acne. Preparations such as hydrocortisone sulphate 25 mg./ml., or triamcinolone acetonide 10 mg./ml. are used at full or diluted strengths.

2. *Cryoslush Therapy*

Cryoslush therapy is becoming a standard acne treatment in the dermatologist's office. Dry ice (CO_2) soaked in a small amount of acetone is applied to the skin by gentle rubbing. The purpose of this treatment is to desquamate the horny layer of the affected skin. The amount of resulting desquamation is determined by the length of time that the contact is maintained between the slush and the skin. Ordinarily, this should be for only a few seconds. Such an application is made about once a week.

SYSTEMIC THERAPY

1. *Oral Antibiotics*

In most theories of the pathogenesis of acne, microorganisms are believed not to invade the tissues, but to damage it indirectly by making harmful chemicals of 2 main types:

1. Those which help formation of comedones – the primary lesion in acne.
2. Those which cause irritation in and around acne lesions causing a host inflammatory response, seen as pustules and cysts.

Numerous studies have shown that the free fatty acids (FFA) are the principal irritant in the pilosebaceous follicle[4]. The origin of the FFA and its relationship with the cutaneous flora and sebum have been subjects of intensive investigation. The direct relationship between the cutaneous bacterial population and the presence of FFA was demonstrated by Scheimann et al[13]. Subsequent work by them and other investigators showed that the FFA arise from the hydrolysis of sebum triglycerides by bacterial lipases[4]. Analysis of the sebum showed that the sebum lipids consisted of 60-70% triglycerides and little FFA which further supports the notion[5]. Careful studies have demonstrated that not all skin bacteria produce FFA in the sebaceous follicle. The major skin flora consists of *C. acnes* and staphylococci, *C. acnes* being the principal FFA producer. A statistically significant correlation between the density of *C. acnes* and the FFA concentration in the surface lipids has been shown[4]. Furthermore, topical antibiotics, like neomycin, suppress bacteria other than *C. acnes*. Only oral antibiotics such as tetracycline were shown to be effective in reducing the *C. acnes* population. A further mode of action of tetracycline is the interference with FFA production from the triglycerides[11]. Other antibiotics (e.g. penicillin, to which *C. acnes* is sensitive) do not produce a fall in sebum FFA and are therefore not effective therapeutic agents. Two reasons can be provided to explain this paradox. Penicillin does not exert inhibitory effects on bacterial lipases and hence FFA production is not interferred with. Penicillin is not bound to cells and cannot reach the cutaneous surface in order to suppress the growth of *C. acnes*.

From the above discussion, there is little doubt that tetracycline is the antibiotic of choice in acne treatment. In fact, numerous papers have confirmed Andrew's original report[2] of the efficacy of tetracycline in acne treatment[4, 5, 11, 12, 13, 15].

Several points should, however, be borne in mind. Tetracycline reduces FFA production whereas sebum production is not affected. This means that the inflammatory lesions are reduced but not the non-inflammatory comedones. Thus tetracycline is useless in comedo treatment (i.e. grade I acne).

As with most drugs, side effects are inevitable. Tetracycline can cause diarrhea and other gastrointestinal irritations. Superinfection with yeasts and other pathogens are also possible although uncommonly seen with the relatively low dose required. Cumulative doses of tetracycline can damage the liver as well as the renal tubules. Hence, tetracycline should be administered with care to patients with renal disease. However, this complication seldom occurs in even long term treatment with "large" dose (1000 mgm.) Tetracycline may lead to a permanent discoloration of neonatal teeth if the drug is given to pregnant mothers after 15 weeks of gestation. Thus, tetracycline should NEVER be prescribed to pregnant women with acne. Erythromycin can be a good alternative drug in this case[15]. It is also good for children under 14. Allergic and photosensitivity reactions are rare with tetracycline therapy.

The usual regimen can begin with 250 mgm. of tetracycline q.i.d. for 5 days, 750 mgm. daily for the next 10 days, then 500 mgm. or 250 mgm. daily as average maintenance dose. Naturally, this regimen can vary depending on the severity of the disease. Oral tetracycline is a long term treatment and the patient should be encouraged to follow the therapy faithfully. The patient should also be informed that improvement is not apparent until several weeks after the therapy has begun. The duration of treatment varies from patient to patient and can last from 1 month to several years without harmful side effects.

2. *Systemic corticosteroids*

Corticosteroids themselves, when used in high dosage produce a papulo-pustulofollicular acneiform eruption. However, they are effective in reducing the inflammatory lesions of severe nodulo-cystic acne. Their use should be reserved for selected severe cases of nodulo-cystic acne with extensive involvement, unresponsive

to other modes of treatment, because of the associated hazardous side effects. Treatment should be of the shortest duration possible, with a suggested initial daily dose in the range of 20 to 30 mgm. prednisone or its equivalent, with gradual withdrawal within a month or so. In exceptional cases, long term treatment may be necessary with concomitant increase in risk of side effects. The dose regimen will be 20 mgm. daily for 1 week, 15 mgm. daily for the next week and then 10 mgm. daily for the next 2 weeks.

3. *Hormones – cyclic estrogen-progesterone therapy*

Sebaceous gland activities are known to be stimulated by androgens. Increased sebum production and hence flareup of acne lesions is commonly seen in the male adolescent period at which time the androgen level is elevated. Rational hormone treatment of acne vulgaris is therefore directed toward efforts to reduce the androgenic effect. Estrogen and progesterone, the naturally occurring antagonists of androgen are used for this purpose. These hormones are given to the patients in the form of oral contraceptives. Many studies have been undertaken to observe the effect of these hormones on acne improvement[10]. Overall results are quite satisfactory. It should be noted that the sebaceous gland secretion is not significantly suppressed until at least the end of the second or third cycle and often not until later (a cycle is 28 days). Moreover, a flareup of the acne may be observed in the second cycle of treatment. The reason for this temporary worsening is not known. The minimum sebum-suppressive dose of estrogen-progestogen has not been established. Current data suggests that it would be in the order of 100 mcg. of mestranol.

The side effects of this cyclic estrogen-progesterone therapy are numerous. Common ones include thromboembolism and chloasma. This therapy is contraindicated in males since it will produce gynecomastia and loss of libido. Absolute contraindications to this therapy include breast or reproductive tract malignancies.

It is quite apparent that hormone therapy in acne is *not* generally indicated. This therapy is only applied to severe acne when other treatments appear to be unsuccessful. Hence hormone therapy in acne vulgaris is intended primarily for grade IV and occasionally for grade III acne.

4 *Hypoglycemic agents*

Hypoglycemic agents such as phenformin do not lower blood glucose in non-diabetics, but they do increase glycogen turnover and sometimes seem to be beneficial in acne treatment. A daily dose of 50 mgm. is taken with breakfast.

5. *Diuretics*

Diuretics like hydrochlorothiazide (Hydrodiuril) appear to be beneficial in some patients, especially when administered for premenstrual flares of acne. A daily dose of 25 to 100 mg. may be given for 5 to 7 days before and during the menstrual period.

6. *Vaccines*

Vaccine therapy with staphylococcus toxoid and acne vaccine is occasionally of value when used in conjunction with other more reliable methods of therapy. Since there are many pathological strains of styphylococci present in man, it is doubtful if the toxoid can antagonize all the various strains.

When vaccines are used, they are primarily to treat secondary infections in and around the acne lesions.

TREATMENT OF ACNE SCARRING

1. *Cryoslush therapy*

Cryoslush therapy is sometimes used to remove superficial small scars. This may require several treatments applied at intervals of 2 weeks.

2. *Dermabrasion*

Another more expensive therapy is dermabrasion. This is the most effective method and it involves removal of the superficial skin layer with a motor-driven wire brush.

A skin area of about 15 sq. cm. is frozen with an alcohol spray such as Frigiderm. The frozen skin is then removed with long and even strokes of the wire brush. The "planing" is stopped as the skin thaws. The next area can be similarly treated. It takes about 4 to 5 weeks for the skin to heal. During this period the patient should avoid sunlight exposure in order to reduce the incidence of hyperpigmentation. Untoward results include milia formation and hyperpigmentation.

One should also note that dermabrasion should be done only on the face. Severe scarring is produced in the neck, trunk and other areas even with moderate skin planing.

3. *Cold quartz UV treatment*

The response to cold quartz light exposures causing blistering and peeling is beneficial. Atropic as well as keloidal scars are removed by peeling. The face and trunk may be treated at 2 week intervals.

4. *Phenol and alcohol*

The value of this therapy is questionable although it has been popular procedure used by cosmeticians to remove wrinkles. Liquefied pure phenol is applied to the affected skin and neutralized immediately with etharmol. The danger of phenol absorption into the body with the production of serious nephritis makes this treatment procedure undesirable.

TREATMENT OF ACNE VULGARIS

SUMMARY OF ACNE VULGARIS THERAPY

Grade I acne

This should be treated by frequent cleansing with soap or cleaning agents and topical peeling agents. (acne lotions or better still *vitamin A acid.*) It is important that the lesions should *never* be picked.

Grade II acne

Somewhat more vigorous additional treatment is necessary. This includes comedo removal by either mechanical expression, cryoslush therapy, or UV radiation. Oral anitibiotics are quite useful. The usual dose of tetracycline is 250 mg. daily for 5 days and a maintenance dose of 250 mg. daily or on alternate days, until improvement is apparent.

Grade III acne

In addition to topical medications a full dose of oral antibiotics should be prescribed and for a longer duration. The usual dose is 100 mg. daily for 5 days, 750 mg. for the next 10 days and then 250 or 500 mg. as maintenance dose. Inflamed pustules and the occasional cysts can be injected with corticosteroids.

Grade IV acne

This advanced stage requires additional therapy other than oral antibiotics and topical medications. Systemic corticosteroids and/or hormone therapy usually give a good response. Pustulo-cystic lesions can be treated with intralesional corticosteroids.

CONCLUSION

The aim of the treatment of acne vulgaris is, if not to "cure", at least to ameliorate or control this common and chronic disease during adolescence and early adult life so that scarring will be minimized. A judicious selection of topical and systemic medication can control the diseasc with good results especially with the recent introduction of topical retinoic acid and hormone therapies.

REFERENCES

1. Anderson, P. C., Food as a cause of acne, Am. Fam. Physician, 3: 3, 102, 1971.
2. Andrews, C., et al. Treatment of Acne Vulgaris JAMA, 146: 1107, 1951.
3. Andrews, C., *Disease of the Skin,* W. Saunders, N.Y. 1971.
4. Freinkel, R. K., Acne Vulgaris: Follicles, fats and flora cutis 7: 409, 1971.
5. Kellum, R., Arch. Derm., 95: 218, 1967.
6. Kligman, A. M., et al, Topical vitamin A acid in acne vulgaris, Arch. Derm. 99: 469, 1969.
7. Mills, A. H. and Kligman, Is sulphur helpful or harmful in acne vulgaris, Br. J. Derm. 86: 620, 1972.
8. Pedace, F. J. and Stroughton, R., Topical retinoic acid in acne vulgaris, Br. J. Derm. 84: 465, 1971.
9. Pillsbury, D. M., *A Manual of Dermatology,* W. Saunders, N.Y. 1971.
10. Pochi, P. and Straues J., in *Pharmaceutical Therapeutics in Dermatology,* Ed. Waisman, M., Thomas, Ill., 1968, ch. 13.
11. Reisner, R. M., Rational Therapy of Acne Vulgaris, cutis, 7: 175, 1971.
12. Savin, J., The Bacteriology of Acne, Br. J. Derm. 86, Suppl. 8: 3, 1972.
13. Scheiman, L., et al, The role of bacteria in the formation of FFA in the human skin surface, J. Invest. Derm., 34: 121, 1960.
14. Stewart, Wm., et al, *Synopsis of Dermatology,* 2nd ed. C. Mosby, 1970.
15. Waisman, N., *Pharmaceutical Therapeutics in Dermatology,* Thomas, Ill., 1968, ch. 14.

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4. *Colour Alterations*

White nails, seen as a result of changes in the nail bed, have been associated with hepatic cirrhosis. The nails appear groundglass with a region of normal colouration at the distal end of the nail. All nails are involved in severe cases. The exact etiology is not known. Paired narrow white bands parallel with the lunula and separated by zones of normal colouration have been described in some cases of chronic hypoalbuminemia. The bands do not move forward as the nails grow. The bands disappear as serum albumin level is restored to normal, but recur on relapse. The reason for their formation is not understood.

Red half-moons have been associated with congestive heart failure. Azure half-moons have been reported in cases of Wilson's disease. Blue half-moons have been noted in a sensitivity reaction to phenolphthalein.

BIBLIOGRAPHY

1. Andrews' Diseases of the Skin, Domokos, A. N., 1971, W. B. Saunders Company, Toronto.
2. Clinical Genodermatology, Butterworth, T. & Strean, L., 1962, Williams & Wilkins Company, Baltimore.
3. Cutaneous Lesions of the Lower Extremities, Samitz, H. H. & Dana, A. S., 1971, J. B. Lippincott Company, Toronto.
4. Dermatology, Pillsbury, D. M., et al, 1965, W. B. Saunders Company, Philadelphia.
5. Manual of Skin Diseases, Sauer, G. C., 1966, J. B. Lippincott Company, Toronto.
6. Synopsis of Dermatology, Stewart, W. D., et al, 1970, C. V. Mosby Company, St. Louis.
7. The Nails in Disease, Samman, P. D., William Heinemann Medical Books Ltd., London.
8. The Skin, Allen, A. C., 1954, C. V. Mosby Company, St. Louis.
9. The Medical Clinics of North America, Vol. 49, No. 3, May 1965, Keiss, F., Present Status of Superficial Fungus Infections of the Skin, Hair & Nails.

Dermatologic Signs of some Systemic Diseases

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Many systemic diseases manifest themselves through changes in the skin and its appendages. Dermatologic lesions may in fact be some of the earliest signs of systemic disease. Although much has been written about the skin in dermatology, relatively few works have dealt specifically with skin manifestations of systemic diseases per se. An "itchy skin" may not be due simply to a "rash" or urticaria but may also be a manifestation of such disorders as malignant lymphomas, uremia, diabetes mellitus or liver disease.

Today with the use of polypharmacy becoming more important, not only must one look out for external manifestations of internal disease but also the vast number of drug-induced cutaneous changes. For example, with the widespread use of steroids one has to be aware not only of minor side-effects of these powerful agents, but also such things as an iatrogenic hypercorticism. Other drugs such as hydralazine may even produce manifestations of a collagen disease.

This enormous and extremely important field obviously cannot be covered adequately in one short article. Therefore, I have attempted to discuss a few representative disease states, indicating their more common or "classical" dermatologic manifestations.

HEPERTHYROIDISM

Hyperthyroidism refers to a state of increased thyroid activity associated with an excess production of thyroid hormones. Commonly it is part of a syndrome which may include exophthalmos, goiter and pretibial myxedema, known as Grave's disease. However thyrotoxicosis can also occur as a result of a number of conditions such as "toxic" nodules, or goiters, medication, or rarely by a functioning thyroid carcinoma or TSH-secreting pituitary adenoma. It is largely a disease of adult women (peak incidence 30-50 years of age).

In hyperthyroidism the skin is warm and moist with a fine smooth texture resembling velvet. Although the skin is fine, radiographic studies have shown that it is of normal thickness. Some of these actions of thyroxine on the skin are unquestionably mediated indirectly through a general increase in heat production and altered cardiovascular hemodynamics, although some observations suggest that thyroid hormone does increase the basal energy metabolism of the skin itself. The skin may be diffusely pigmented to give a bronze appearance or melanoderma. Melasma of the cheeks may sometimes be seen. However, thyroid hormones have an as yet unexplained effect on pigmentary changes as hyperthyroidism may cause hyper – as well as hypopigmentation (vitiligo). Increased eccrine gland activity leads to increased sweating, especially on the palms and soles. Pruritus may also be present. On examining the extremities one can often detect elbow and palmar erythema and onycholysis. Pretibial myxedema is sometimes a complication of hyperthyroidism. The etiology of this is uncertain although some people think LATS may be involved. The hair is fine and thin with a downy texture. There may be marked sparcity and hair may be lost in a diffuse fashion during active hyperthyroidism.

HYPOTHYROIDISM

Hypothyroidism refers to a state characterized by progressive slowing of all bodily activities due to a deficiency of thyroid hormone. Myxedema is the severest form and is characterized by infiltration of the skin by nonpitting, mucinous edema. Whatever the cause of thyroid hormone deprivation, the results are similar with a slow progressive infiltration of the skin by mucopolysaccharides and mucoproteins, giving a puffy appearance. Cretinism results from congenital hyprothyroidism and the infant is characterized by having increased hair, low forehead, enlarged tongue, puffy features, umbilical hernia and sluggish behavior. Later on, other features such as retarded growth and mental retardation are noted.

In hypothyroidism the epidermis is thick and dry (Icthyosis) with a rough, scaly texture (hyperkeratosis) and appearance. Histologically the hyperkeratotic epidermis has keratotic plugs in hair folicles and sweat ducts which may lead to the decreased oiliness and sweating. Keratotic lesions also occur on the knees, albows and buttocks, resembling the lesions of vitamin A deficiency. In the cutis there is edema and basophilic degeneration of collagen. Mucin is widespread throughout the cutis and subcutaneous tissue and sometimes undergoes thickening with obliterative changes in smaller vessels. This probably attributes to the state of myxedema and the process of poor wound healing. The vascular changes also lead to changes such as plethora, purpura and decreased skin temperature. Pruritus may also be present. Although the skin is usually wax-like, translucent and firm, pigmentation of the skin may be greatly increased from a slight yellowish tinge to the point of general bronzing. The ivory yellow color is due to increased levels of carotene in the stratum corneum. Xanthomas may also appear during the state of hypothyroidism. The hair is coarse and dry with varying degrees of alopecia. Hair also disappears from the outer part of the eyebrows. The cretin has a cool, dry pasty white skin usually with black scalp hair. Pigmentation is less than normal after exposure to sunlight. The nails are slowgrowing, brittle and often show longitudinal and transverse striations. The teeth are poor and break easily. The changes in myxedma are usually reversible by judicious use of thyroid hormones.

DERMATOLOGIC SIGNS OF SOME SYSTEMIC DISEASES

DIABETES MELLITUS

Diabetes mellitus is a generalized chronic metabolic disorder probably due to inadequate secretion of insulin. Although the most obvious derangement is that of carbohydrate metabolism, the fate of proteins, fats, electrolytes and water are all inter-related in the disease. Diabetes mellitus usually develops in subjects with a genetic predisposition. When fully developed is manifested by weakness, lassitude, weight loss or failure to grow, hyperglycemia, ketosis, acidosis, and protein breakdown. Later, various neurological and vascular complications usually occur. Due to the dynamic variability of the metabolic state from the prediabetic through to the full blown diabetic there is much confusion regarding the specificity of certain skin lesions. Although the effects of insulin have been studied in many tissues (e.g. muscle, adipose tissue) the skin has beeen left relatively untouched with respect to the effects of insulin. One scheme to categorize dermatologic lesions is to separate cutaneous manifestations into three categories: Those which may precede chemical diabetes or occur in overt diabetes with adequately controlled blood glucose; those which are temporally coincide with marked metabolic derangements; and those which result from the administration of insulin.

A number of lesions may be recognized which may antedate chemical diabetes or occur in overt diabetes when it is reasonably well controlled. Microangiopathy of the skin may occur in clinically "normal" skin of diabetics. Atrophic circumscribed lesions of the lower extremities also occur, with a preference for male subjects. These lesion are a light brown color with irregular borders and resembles ordinary atrophic scars from trauma. They often arouse suspicion of diabetes which is later confirmed by testing glucose tolerance. Necrobiosis lipoidica diabeticorum most usually found on anterior and lateral surfaces of lower legs also sometimes occur. They appear in greater numbers in female subjects. They progress from small, dusty-red nodules to flat brownish yellow patches with well defined borders – shallow ulcerations sometimes appear in long standing lesions.

The second category of dermatologic lesions involve those that are temporally coincident with marked derangements of intermediary metabolism (hyperglycemia and lipidemia) and subside when correction of derangements occur. Infections such as furunculosis, candidiasis and epidermatophytosis, may be troublesome. It is not yet establish whether a diabetic is more prone to infections or is less able to deal with them effectively once the infection has taken hold, although the latter appears to enjoy greater support. It is a serious hazard for diabetic patients to contract infections of the lower extremities due to their increased incidence of peripheral neuropathy and arteriosclerosis. Atherosclerotic complications may lead to atrophy and shininess of skin, peripheral hair loss, decreased skin temperature and skin ulcers. Arteriosclerotic ulcers which appear as pale, ischemic ulcerations sometimes occur on the foot, heel or other areas of the lower leg. Eruptive xanthomas may appear with uncontrolled hyperlipidemia. These are reddish yellow nodules, usually on the extensor surfaces and buttocks, and are indistinguishable from other forms of disseminated or eruptive xanthomatoses. With control of diabetes the tendency to develop these cutaneous lesions decreases.

The third category of lesions involve those which result from the administration of anti-diabetic agents. These are generalized allergic reactions and occur with oral hypoglycemic agents as well as with insulin. These occur infrequently and generally manifest as localized urticaria (the most frequent allergic response to insulin). Occasionally an acute inflammatory reaction will occur at the site of insulin injection. A lipodystropic lesion with atrophy or hypertrophy of subcutaneous fat may also occur in regions of injection.

LUPUS ERYTHEMATOSUS

The connective tissue diseases such as lupus erythematosus (L.E.), dermatomyositis, and scleroderma exhibit a wide range of skin signs, some fairly specific while others only suggestive of a connective tissue disease. Reactivity of the vascular system, such as telangiectasia, vasospastic phenomena, and necrotizing arteritis, are common to the connective tissue diseases. However, the degree of cutaneous involvement is not indicative of the extent of visceral disease. The connective tissue disorders are also interesting with respect to the autoimmune diseases in general.

Systemic lupus erythematosus (SLE) is a chronic disease of unknown origin which can affect many organ systems. Although the classic facial "butterfly rash" facilitates diagnosis, it need not be present (usually present in 1/3 to 1/2 of patients). Lupus erythematosus occurs predominantly in females generally between 10 and 40 years of age. Some types of cutaneous involvement is present in from 70 to 85 percent of patients with SLE. An erythematous rash of a variety of types is the most frequent cutaneous manifestation. The typical butterfly-shaped erythematosus blush in the malar area, although not universally present, is not uncommonly the presenting symptom, occurring frequently after sun exposure. A maculopapular erythematous rash, similar to a drug eruption, frequently pruritic and usually on the trunk above the waistline, is also a common presenting rash. Alopecia is also an important marker. When a patient is very ill, telogen effluvian may occur leading to almost complete alopecia. One may also get cuticular telangiectasia with periungal erythema, as these signs are often present in connective tissue disorders.

The term discoid lupus erythematosus is generally applied to cases where there is only cutaneous involve-

ment. However SLE and discoid lupus erythematosus are different manifestations of the same disease. Discoid lupus erythematosus is generally a benign disease with good prognosis. The classic discoid lesion is a scaly erythematous atrophic plaque. This sometimes resembles psoriasis although the latter does not have atrophic lesions. Discoid plaques may be single or multiple and often involve the malar regions. Subcutaneous nodules called Lupus profundus usually develop beneath the typical discoid lesions of LE. Severe scarring, involving atrophy and pigmentation changes, can produce ugly disfigurement in patients with LE. In summary, it can be said that the discoid plaque is pathognomonic of LE, whether cutaneous or systemic LE, and only careful investigation will differentiate the two states.

CHRONIC LIVER DISEASE

Since the liver is prone to a large number of disease states, only some of the more "classical" manifestations of "liver disease" will be mentioned. However, most of the skin manifestations will be directed toward cirrhosis, although cirrhosis itself may include a vast number of etiologies (e.g. idiopathic, alcoholic, metabolic, biliary). It must be pointed out that advanced liver disease may be present with minimal cutaneous manifestations. On the other hand, skin changes may also occur long before the development of serious disease. For example severe pruritis may antedate recognizable biliary cirrhosis by many months.

Pigmentary changes such as jaundice, or icterus, and melanosis are often associated with hepatic disease. Clinically detectable jaundice is always indicative of disease and must be differentiated from other conditions such as carotenemia, a simple olive or sallow skin complexion, or pigmentation produced by a number of chemical agents such as Atabrine. Carotenemia may occur in people with hypothyroidism, diabetes mellitus and sometimes in people who consume a large amount of carotenoids (e.g. some vegetarians). Although jaundice, caused by staining by bile pigments, is usually thought of as being caused by hepato-biliary disease per se (e.g. hepatocellular jaundice, obstructive jaundice) it may arise as a result of hereditary hyperbilirubinemia or hemolytic causes. Although jaundice causes a widespread diffuse yellowing it is probably most easily detected on the sclera.

Melanosis may also occur in many patients with subacute or chronic hepatobiliary disorders. This may result in a localized or nonspecific generalized skin hyperpigmentation. Hemochromatosis can present clinically with hyperpigmentation (particularly of exposed areas), cirrhosis, and diabetes mellitus. The classic bronze colour seen in this disease may be due to a combination of deposition of hemosiderin in the corneum and of melanin in the deep epidermis. Although Wilson's Disease does not present as a pigmentary change per se, it does present with a Kayser-Fleischer ring along with signs of basal ganglia degeneration and cirrhosis of the liver (e.g. spider nevi, ecchymoses, and sparse hair).

Pruritus may also occur with hepato-biliary disease and is present in 20-25 percent of jaundiced patients. However, pruritus is not dependent upon the concentration of bile pigment and itching may occur in liver disease without icterus. Some evidence suggests that bile acids in the skin are actually responsible for the pruritus. The itching of hepatic origin is usually generalized.

Various blood and small vessel lesions may also result to produce such things as spider nevi, palmar erythema and ecchymoses. Spider nevi (spider angiomas) are most numerous when liver disease is chronic and progressive. They develop most frequently on the face, arms, hands and trunk (usually above the umbilicus). Although commonly associated with cirrhosis, they also occur in pregnancy and idiopathically in children and yound adults. Palmar erythema, a cutaneous erythema maximum over the thenar and hypothenar eminences and pulp of the fingers, often accompanies spider nevi. Besides liver disease it may also be present during pregnancy and thyroid disease. A decrease in hepatic function may decrease prothrombin levels resulting in cutaneous purura, epistaxis and gingival bleeding. Also there may be scattered and slowly resolving purpura of the lower extremities as a result of edema, the acquired clotting defects and cutaneous wasting. Due to portal hypertension a number of portal-systemic collateral vessels may become engorged and more visible in such areas as the skin over the abdomen (e.g. Caput Medusae).

Xanthomas may also result from hepato-biliary diseases. They consist of lipid deposits in the macrophages of the dermis or subcutaneous tissues. Besides biliary cirrhosis, which may produce a spectacular xanthomatosis, hyperlipidemia, hypothyroirism, diabetes mellitus and Histiocytosis X may also cause xanthomas. In biliary cirrhosis the patient, who may appear relatively healthy, will often present with pruritus, hyperpigmentation, jaundice and xathomas. Here the xanthomatosis may include xanthelesma, tuberous xanthomas over extensor and pressure areas and plane xanthomas (which may occur in scars).

A number of other cutaneous manifestations may also occur in chronic liver disease. For example a male with alcoholic cirrhosis may present with sparse axillary, pubic and pectoral hair, and is often affected by gynecomastia, testicular softening and loss of libido. White nails have been reported in a number of persons with cirrhosis although this may also occur in a number of different conditions and has little diagnostic value. Clubbing may also occur in up to 18 percent of people with cirrhosis.

(Continued on page 48)

J. R. Nethercott, M.D.*

Dermatology Grand Rounds — Questions

CASE 1

This 58 year old lady developed right flank pain which was followed 2 days later by a localized bullous eruption.

a) Could the rash suggest underlying disease?

b) What epidemic disease may originate from such cases?

CASE 2

Two weeks before this eruption began the patient had a severe sore throat. The red nodules on her skin are warm, tender and painful. Old lesions are brown, like bruises, while new ones continue to erupt. The erythrocyte sedimentation rate was 98 mm. in the first hour. She had an antistreptolysin D titre of 500 Todd units.

What are the three most common antecedent causes of this cutaneous reaction pattern?

CASE 3

This child has had a slowly enlarging bound-down patch of scalp hair loss for one year. Red circumscribed patches of telangiectatic skin with "carpet-tack" scales are noted on her face, V of the neck and the dorsal aspects of her hands. She thinks she is "allergic to the sun". Functional inquiry was otherwise unremarkable. All laboratory tests, including an antinuclear factor test, were normal.

Is this patient likely to develop a systemic form of her disease?

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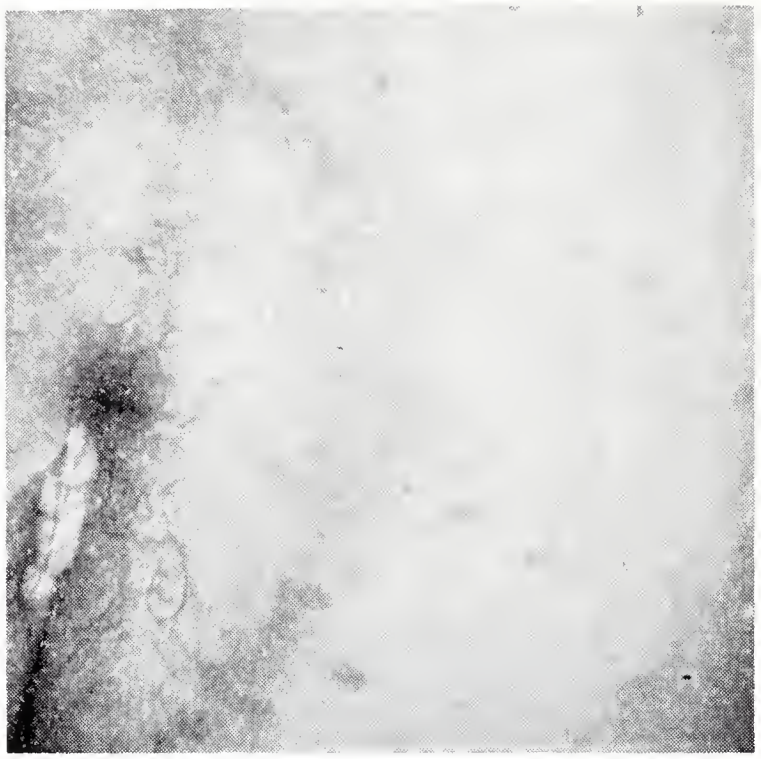

CASE 4

This middle-aged obese man with polyuria developed this itchy eruption in his groin three weeks ago. Note the uniformity of colour, the distinct border and the presence of small pustules at the edge of the rash.

a) what are the common infectious causes of intertrigo?

b) In this man, is there a systemic disease that may underlie the presenting problem?

Dermatology Grand Rounds — Answers

CASE 1

Dianosis: Herpes Zoster

a) Malignancy, especially lymphoma

CASE 2

Diagnosis: Erythema Nodosum

1. Streptococcal Infection
2. Tuberculosis
3. Acute Sarcoidosis

CASE 3

Diagnosis: Discoid Lupus Erythematosis

No, less than 5 % of such cases proceed to develop Systemic L.E.

CASE 4

Diagnosis: Monilial Intertrigo

a) Moniliasis, Tinea Cruris, Erythrasma, Non-specific Bacterial Intertrigo

a) Diabetes Mellitus

(Continued from page 46)

CONCLUSION

From this article it can be seen that many systemic diseases do indeed have well-documented cutaneous manifestations. If these manifestations were looked for and thought of as part of an ongoing systemic disease and not as isolated dermatologic events, perhaps many diseases could be more easily understood and diagnosed.

REFERENCES

Beeson, P. B. and McDermott, W.: *Cecil-Loeb Textbook of Medicine,* Philadelphia, W. B. Saunders Company, 1971.

Braverman, I. M.: *Skin Signs of Systemic Disease,* Philadelphia, W. B. Saunders Company, 1970.

Domonkos, A. N.: *Andrews' Diseases of the Skin,* Philadelphia, W. B. Saunders Company, 1971.

Fitzpatrick, T. B., et al: *Dermatology in General Medicine,* New York, McGaw-Hill Book Company, 1971.

MacBryde, C. M. and Blacklow, R. S.: *Signs and Symptoms,* Philadelphia, J. B. Lippincott, 1970.

Pillsbury, D. M.; Shelley, W. B. and Kligman, A. M.: *Dermatology,* Philadelphia, W. B. Saunders Company, 1965.

Stewart, W. D.; Danto, J. L. and Maddin, Stuart: *Synopsis of Dermatology,* Saint Louis, The C. V. Mosby Company, 1970.

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